CHEMISTRY NMDCAT

(UNIT–2)

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TOPICS

✓ **ATOMIC STRUCTURE**

Q.1 Number of electrons and orbitals in a sub-shell can be determined by
a. n^2, 2n
b. $2(2\ell+1)$, n^2
c. $2(2\ell+1)$, $2\ell+1$
d. $2n^2$, n^2

Q.2 Magnetic quantum number is related to
a. Size of orbitals
b. Energy of sub-shell
c. Orientation of orbital
d. Shape of orbital

Q.3 Which one has shortest wavelength when moving with the same velocity
a. Proton
b. Electron
c. Neutron
d. α-particle

Q.4 The electronic configuration of metal ion M^{+2} is 2, 8, 14 and its atomic mass is 56. The number of neutrons in its nucleus is
a. 30
b. 32
c. 34
d. 42

Q.5 Which of following has same number of electron as α–particle
a. Li^+
b. H^+
c. He^+
d. Be^{+2}

Q.6 The wavelength of which of the following pair is same
a. Absorption and emission spectrum of the same element
b. X – rays and γ - rays
c. Continuous and line spectrum
d. IR and UV light

Q.7 In Hydrogen spectrum least energetic transitions of electrons are found in
a. Lyman series
b. Paschen series
c. Brackett Series
d. Pfund series

Q.8 de–Broglie equation is applicable to only
a. Microscopic particles
b. Magnetic particle
c. Macroscopic particles
d. Neutral particles

Q.9 The last electron in the Na and K can be distinguished by
a. Principal quantum number
b. Azimuthal quantum number
c. Magnetic quantum number
d. Spin quantum number

Q.10 The de-Broglie's wavelength of a particle having momentum 2.2×10^{-24} kgms^{-1} (Planck's constant = 6.6×10^{-34} Js)
a. $0.5 A^\circ$
b. $2A^\circ$
c. $3A^\circ$
d. $3.5A^\circ$

Q.11 Charge on one kilogram of electrons is
a. 1.602×10^{-19}C
b. $1.602 \times 10^{+19}$C
c. 1.7588×10^{-11}C
d. 1.7588×10^{11}C

Q.12 The atomic number of an element is 15. It belongs to period and group number of the periodic table respectively
a. 5, 3
b. 6, 3
c. 3, 6
d. 3, 5

Q.13 Which contains most stable orbitals in the valence shell
a. O^{+1}
b. N^{-1}
c. Mg^{+1}
d. S^{-1}

Q.14 Mass of a proton is approximately equal to
a. Mass of positron
b. Mass of electron

c. Mass of neutron

d. Mass of nucleus

Q.15 **The difference of energy and radii between first two orbits is**
a. Maximum, minimum

b. Maximum, minimum

c. Both are maximum

d. Both are minimum

Q.16 **In the hydrogen atom, when electron jumps from any high energy orbit to 1ˢᵗ orbit, the radiation emitted will fall in the**
a. UV region

b. Visible region

c. I.R region

d. Microwave region

Q.17 **How many electrons can fit into the sub-shell for which n = 3, l = 1?**
a. 8

b. 18

c. 6

d. 32

Q.18 **How many total unpaired electrons are present in an atom with Z = 24**
a. Two

b. Five

c. Six

d. Eight

Q.19 **If an electron has to excite from 4f, it will go into**
a. 3p

b. 5s

c. 5d

d. 3d

Q.20 **Without applying Hund's rule the electronic configuration of one of the following cannot be justified**
a. Fluorine

b. Neon

c. Sodium

d. Phosphorous

Q.21 **Which combination of energy sub-levels are used to write the electronic configuration of Mg**
a. s, p

b. s, p, d

c. s, p, d, f

d. Only s

Q.22 **Oribt gives us the idea about the _____**
a. Three dimensional motion of an electron

b. Elliptical motion of electron

c. Plane motion of electrons

d. Motion of electron in straight line

Q.23 **The value of Rydberg constant is**
a. $1.09678 \times 10^7 \text{m}^{-1}$

b. $1.9678 \times 10^7 \text{m}^{-1}$

c. $1.09678 \times 10^6 \text{m}^{-1}$

d. $1.09678 \times 10^8 \text{m}^{-1}$

Q.24 **For 6f subshell, the quantum numbers are**
a. $n = 6, l = 2$

b. $n = 3, l = 3$

c. $n = 6, l = 3$

d. $n = 6, l = 1$

Q.25 **Which set of quantum numbers is not possible**
a. $n = 5, l = 3, s = +\frac{1}{2}$

b. $n = 5, l = 4, s = +\frac{1}{2}$

c. $n = 1, l = 2, s = +\frac{1}{2}$

d. $n = 6, l = 0, s = +\frac{1}{2}$

Q.26 **The space between 1s and 2s is called**
a. Free space

b. Orbital

c. Node

d. Antinode

Q.27 **Wavelength of a photon of light emitted by a certain source is 200 A° The wave number will be**
a. $5 \times 10^{-3} \text{m}^{-1}$

b. 500 nm^{-1}

c. $5 \times 10^7 \text{m}^{-1}$

d. $500 \times 10^7 \text{ m}^{-1}$

Q.28 **The highest energy electron of an element in the ground state is characterized by the following quantum numbers** $n = 4, l = 0, m = 0, s = +1/2$
The atomic number of element is
a. 32

b. 19

c. 22

d. 12

Q.29 **Which formula represent wave number of electrons**
a. $1.0678 \times 10^7 \left[\dfrac{1}{n_1} - \dfrac{1}{n_2} \right]$

b. $1.09678 \times 10^7 \left[\dfrac{1}{n_1^2} - \dfrac{1}{n_2^2} \right]$

c. $1.09678 \times 10^{-7} \left[\dfrac{1}{n_1} - \dfrac{1}{n_2} \right]$

d. $0.09678 \times 10^{-7} \left[\dfrac{1}{n_1^2} - \dfrac{1}{n_2^2} \right]$

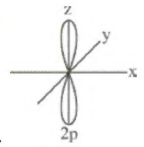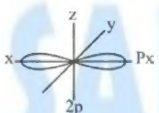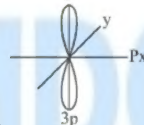**Q.30** The number of sub-shells in sulphur atom is

a. 4
b. 6
c. 7
d. 5

Q.31 Which one orbital in bilobed with collar

a.
b. d_z^2
c. d_{xy}
d. d_{yz}

Q.32 The number of orbitals in a shell can be calculated by formula

a. $2l+1$
b. $2(2l+1)$
c. $2n^2$
d. n^2

Q.33 Which species has same number of electrons in valence shell and penultimate (second last) shell

a. Na^+
b. O^{-2}
c. Al^{+3}
d. Cl^-

Q.34 Which of the following specie has more electrons than neutrons?

a. Na^+
b. F^{-1}
c. O^{-1}
d. Mg^{+2}

Q.35 Which of the following does NOT correctly relate the arrangement of electrons?

a. Arrangement of sub shell is given by $(n + l)$ rule

b. Filling of electrons in degenerate orbitals is given by Hund's rule

c. Filling of electrons in an orbital is given by Pauli's exclusion principle

d. Arrangement of electrons in a shell is given by octet rule

Q.36 An electron makes a transition from energy state four to two. It will emit a photon of frequency

a. $\dfrac{E_2 - E_4}{h}$
b. $\dfrac{E_4 - E_2}{h}$
c. $(E_4 - E_2) \times h$
d. $(E_2 - E_4) \times h$

Q.37 Which order of mass is correct in ascending order

a. $e^- > p^o > n$
b. $e^- < n < p^+$
c. $e^- < p^+ < n$
d. $n > p^+ > e^-$

Q.38 Which statement is wrong about quantum numbers

a. 'n' gives the idea of energy and size of an orbit

b. 'l' gives the shape of an orbital

c. 'm' gives the energy of an electron in an orbital

d. 's' gives the direction of spin in an orbital

Q.39 The probable values of Azimuthal quantum number 'l' for n = 3 are

a. 0, 1, 2, 3
b. 0, 1, 2
c. 0, 1
d. 1, 2, 3, 4

Q.40 Which electronic configuration is not possible?

a. $1s^2, 2s^2, 2p^6, 2d^2, 3s^1$

b. $1s^1$

c. $1s^2, 2s^2, 2p^1_x, 2p^1_y, 2p^1_z$

d. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2$

Q.41 The positive rays have maximum e/m value when one of the following gas is used in discharge tube

a. O_2

b. N_2

c. F_2

d. Cl_2

Q.42 What is the correct sequence of energy in the orbitals according to $(n + \ell)$ rule

a. $3p < 4s < 4p < 3d$

b. $3p < 4s < 3d < 4p$

c. $3p < 3d < 4s < 4p$

d. $4s < 3p < 3d < 4p$

Q.43 The number of unpaired electrons in the carbon atom in ground state

a. 4

b. 2

c. 3

d. 1

Q.44 If $\ell = 1$ then orbitals in which the value of m = +1, 0, –1 are

a. $p_x, p_y, d_{xy},$

b. d_{xy}, d_{yz}, d_{xz}

c. p_x, p_y, p_z

d. d_{x2-y2}, d_{z2}

Q.45 Which orbital is biggest in size and have maximum energy

a. $2p_x$

b. $4p_x$

c. $3p_x$

d. $5p_x$

Q.46 Which orbital correctly represents the last electron in the element of VII-A group and 3rd period

a. 3s

b. 2p

c. 2p

d. 3p

Q.47 Number of electrons in tripositive ion of aluminium are

a. 8

b. 10

c. 13

d. 3

Q.48 When we distribute the electron in K-atom, the shape of valence orbital in which last electron is present is

a. Spherical

b. Complicated

c. Dumb-bell

d. Has no specific shape

Q.49 The charge on proton is

a. -1.6×10^{-31} C

b. 1.6×10^{-31} C

c. -1.6×10^{-19} C

d. $+1.6 \times 10^{-19}$ C

Q.50 The mass of proton is 1836 times ………..

a. Smaller than electron

b. Greater than neutron

c. Greater than electron

d. Smaller than neutron

Chem. Test 2   ATOMIC STRUCTURE

1-C	16-A	31.B	46.D
2.C	17-C	32.D	47_B
3-D	18-C	*33.D	48.A
4-A	19-C	34.C	49_D
*5-B	20.D	35-D	50.C
6-A	21-A	36-B	
7-D	*22.C	37-C	
8.A	23.A	38-C	
9.A	24.C	39.B	
10.C	25.C	40.A	
11-D	26-C	41.B	
12-D	27.C	42-B	
13-A	28-B	43.B	
14-C	29.B	44.C	
15- A,B	*30.D	45.d	
1			

wave no ∝ 1